

and/or detritus needs to be introduced between the threaded formations in order to result in the jamming of the threaded interconnection.

5 The prior art methods of monitoring the threaded engagement between two components has comprised monitoring the magnitude of the torque that is applied whilst effecting the threaded engagement. Whilst this procedure has been found to be effective in many cases it lacks the sensitivity to draw attention to faults which do not significantly affect magnitude of the torque being applied during the process of engagement but present a significant problem in the disengagement

Disclosure of the Invention

10 Accordingly the invention resides in a means for monitoring the assembly of threaded components comprising a station at which two threaded components are to be threadably interengaged, a heat sensor adapted to sense infra red radiation, the sensor located and positioned at the station to sense the temperatures over the inter-engaged surfaces of the threaded coupling whilst being threadably
15 engaged or disengaged, an output associated with the sensor which is adapt to display an indication of the variations of the temperatures of the inter-engaged surfaces of the coupling during assembly or disassembly of the components.

According to a preferred feature of the invention the output comprises a display. According to a preferred feature of the invention the display comprises a pictorial
20 representation of the coupling which indicates the temperatures of the inter-engaged surfaces of the coupling being monitored. According to a preferred feature of the invention the sensor comprises an infrared camera.

According to a preferred feature of the invention a plurality of sensors are located at the station, said sensors being angularly displaced around the coupling during
25 assembly or disassembly to scan the full outer surface of the coupling. According to one embodiment the display comprises a single image which is representative of the full surface area of the coupling and which is a composite of the output of each of the sensors.

Accordingly to another aspect the invention resides in a method of monitoring the assembly of threaded components comprising sensing the variation in temperatures of the inter-engaged surfaces of the threaded coupling whilst being threadably engaged or disengaged and monitoring the temperature of the inter-engaged surfaces of the coupling for the occurrence of zones which are the subject of an increased temperature when compared to the remainder of the threaded coupling.

According to preferred feature of the invention the method comprises the use of a monitoring means of the from described above.

The invention will be more fully understood in the light of the following description of several specific embodiments.

Brief Description of the Drawings

The description is made with reference to the accompanying drawing which is a schematic representation of the monitoring means according to the first embodiment.

Detailed Description of Specific Embodiments

The first embodiment is directed to means for monitoring the assembly of threaded coupling and has particular application to threaded couplings which are used for interconnecting tubing and casing string components. It is general practice that these components are assembled under factory conditions into units which can then be taken to a drill site and applied to a drill string as they are required. The threads which are used to threadably interconnect such components are generally of a very precise profile and are manufactured to very close tolerances. Furthermore once installed the threaded components must be capable of being readily uncoupled to enable them to be extracted from a drill string for use on another occasion as required. Therefore whilst the threaded connection must be sound during use it must be readily capable of being